



# First record of *Rhipsalis oblonga* (Cactaceae), a threatened plant species, in Minas Gerais state, Brazil

**Diego Rafael Gonzaga<sup>1\*</sup>, Daniel Elias F. Barbosa<sup>2</sup>, Geicilaine Alves Basílio<sup>2</sup>, Fernando Rodrigues da Silva<sup>2</sup> and Luiz Menini Neto<sup>2,3</sup>**

1 Escola Nacional de Botânica Tropical, Rua Pacheco Leão 2040, Solar da Imperatriz, Horto, 22460-036, Rio de Janeiro, RJ, Brazil

2 Centro de Ensino Superior de Juiz de Fora, Campus Arnaldo Janssen, Luz Interior 345, Santa Luzia, 36030-776, Juiz de Fora, MG, Brazil

3 Universidade Federal de Juiz de Fora, Programa de Pós-graduação em Ecologia, Campus Universitário, Martelos, 36036-900, Juiz de Fora, MG, Brazil

\* Corresponding author. E-mail: [diego.gonzaga@gmail.com](mailto:diego.gonzaga@gmail.com)

**Abstract:** We present the first record of *Rhipsalis oblonga* in Minas Gerais state, Brazil. This record suggests that this species, having a global rank of Vulnerable, is nevertheless threatened in Minas Gerais with extirpation due to the small area of occupancy that is outside of any conservation unit. We present morphological data for this species and comment on its ecology and distribution.

**Key words:** Atlantic Forest, endangered species, epiphyte, South America

The conservation of the Brazilian Atlantic Forest is extremely important because it harbors a huge biodiversity with many endemics and thus is considered a world biodiversity hotspot (Myers et al. 2000). Despite its species richness and ecological importance, the Atlantic Forest is highly threatened due to disorderly urban expansion, agriculture and mineral extraction, leading to deforestation and environmental disturbance (Lino et al. 2007).

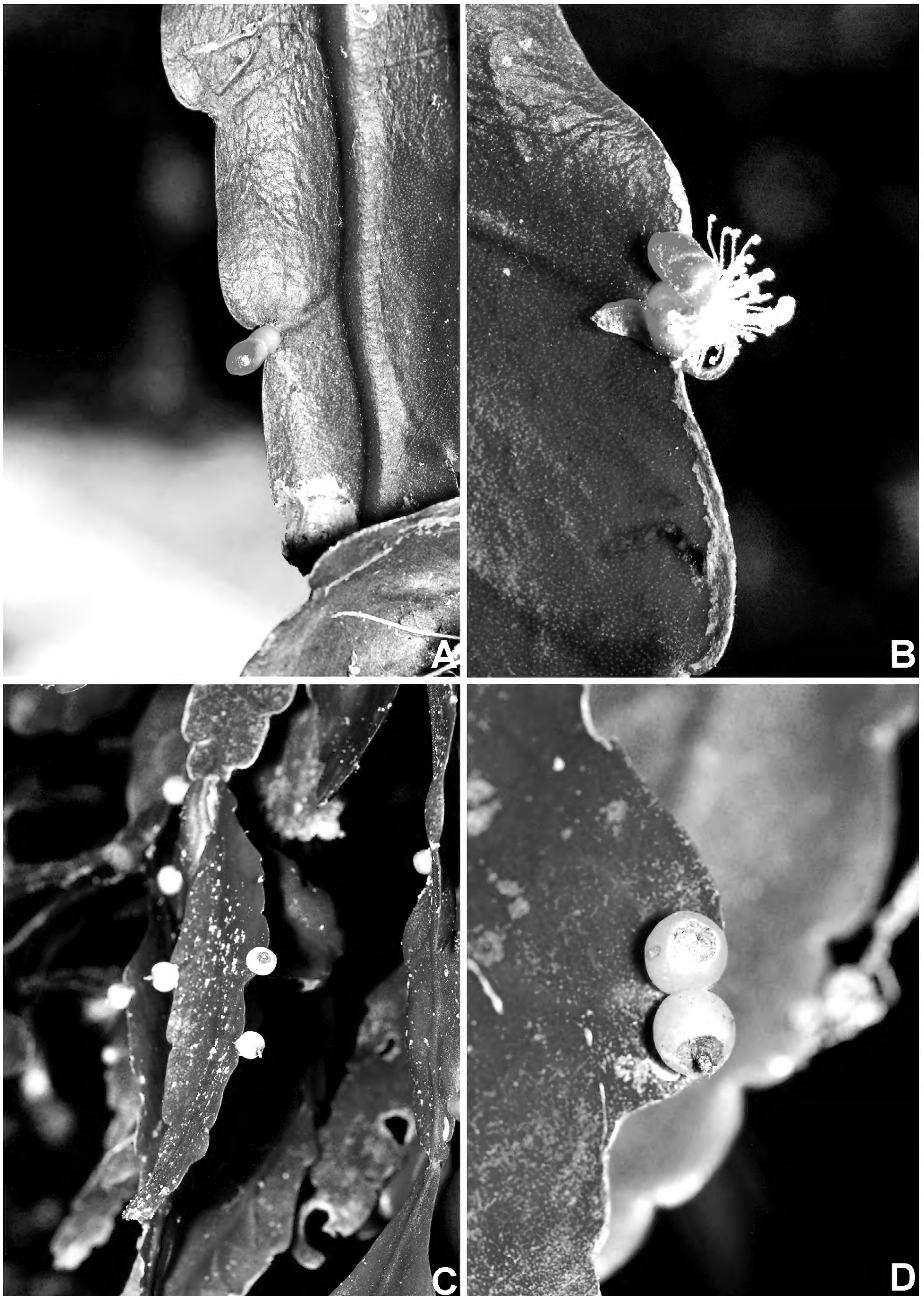
Minas Gerais is the fourth largest state of Brazil, with an area of about 590,000 km<sup>2</sup>, harboring different vegetation formations, such as savannah (Cerrado), Atlantic rainforest (Floresta Atlântica) and scrubland (Caatinga). However, due to human activity, most of its original vegetation cover is now reduced to isolated remnants. In Minas Gerais, the largest remnants of Atlantic Forest lie in Serra da Mantiqueira. This mountain region is considered an area of high biological importance due to its remarkable biodiversity and critical knowledge gaps about this biodiversity (Drummond et al. 2005).

The Cactaceae are highly diversified in eastern Brazil, where the Serra da Mantiqueira is located (Taylor and

Zappi 2004). The family comprises of 124 genera and ca. 1,438 species distributed from Canada to Patagonia, with the largest diversity in tropical and subtropical America. The only species in this family that occurs natively outside the Americas is *Rhipsalis baccifera* (J.M.Muell.) Stearn (Stearn 1939: 107), which also occurs in Africa, Sri Lanka and Madagascar (Hunt et al. 2006; Calvente et al. 2011). In Brazil, the Cactaceae are represented by 39 genera and 254 species, of which 27 genera and 102 species are found in Minas Gerais, demonstrating the importance of this state to the biodiversity of cacti (Zappi et al. 2015). Cactaceae species are greatly affected by anthropic disturbance, which causes rapid destruction of their habitats, especially of narrow endemic species (Calvente 2012). *Rhipsalis* Gaertn. is the richest genus of Cactaceae in Brazil and includes 37 species, which are mainly epiphytic and epipetric (Calvente 2012; Zappi et al. 2015).

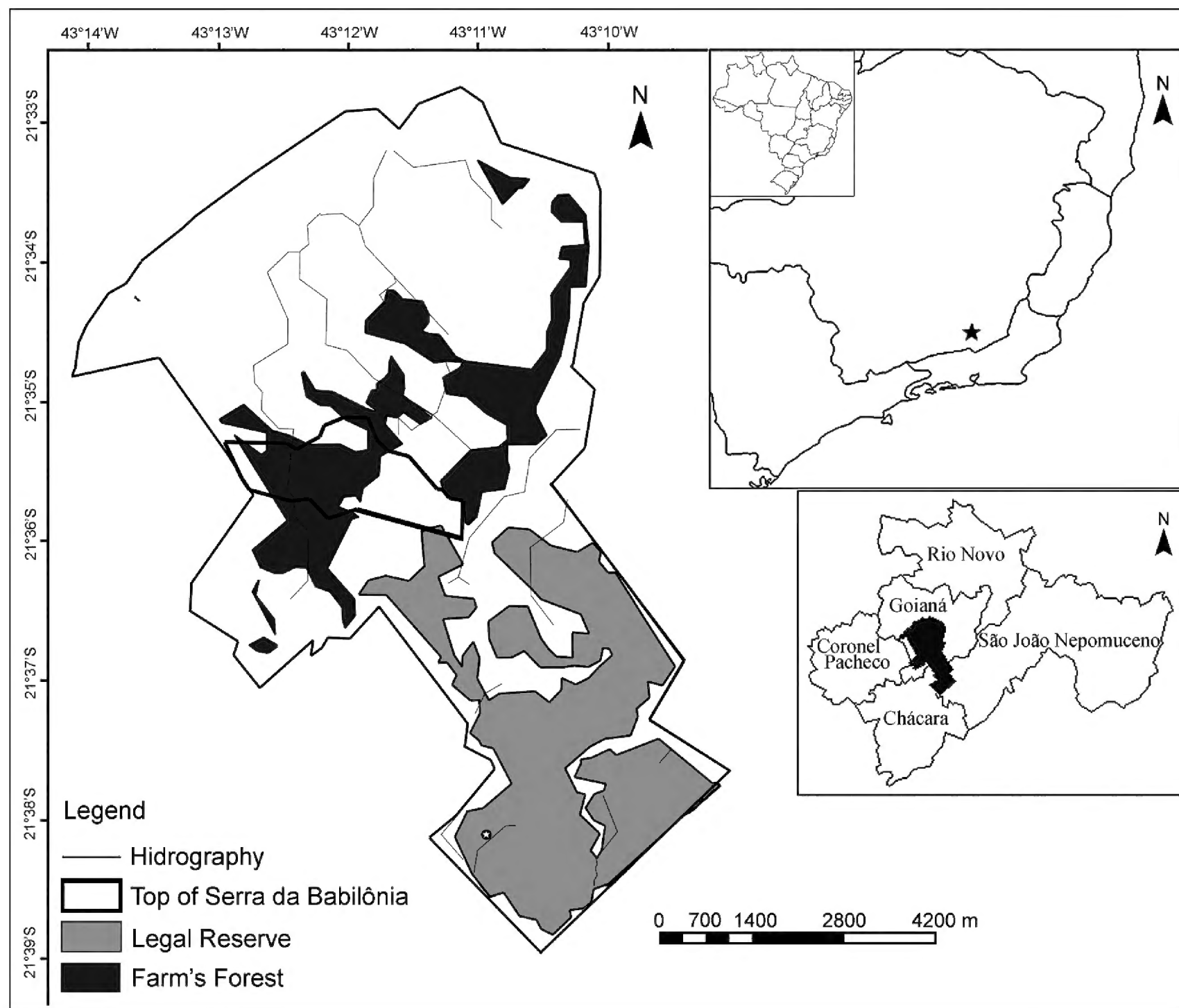
This study presents the first record of *Rhipsalis oblonga* Loefgr. (Löfgren 1918: 36–37) (Figure 1) for Minas Gerais. This record is a result of a survey of the vascular epiphytic flora of a seasonal semi-deciduous forest fragment in Fazenda Fortaleza de Sant’Anna, Zona da Mata of Minas Gerais (22°01’ S, 043°56’ W) (Barbosa et al. 2015). The area is located between the municipalities of Goianá, Coronel Pacheco, São João Nepomuceno and Chácara, at altitudes between 800 and 900 m above sea level, with a total area of ca. 600 ha (Figure 2), and is surrounded by crops and pasture. The climate is Cwb, according to the Köppen classification, which is defined by dry and cold winters and rainy and warm summers (CETEC 1983).

We noted the relevant data of the specimens in field, and after photographing the plants, they were collected and curated. The specimens were deposited in the CESJ



**Figure 1.** Aspects of *Rhipsalis oblonga*. **A.** floral bud; **B.** flower at anthesis; **C.** plant habit with fruits; **D.** mature fruits. (Photos: Luiz Menini Neto; A–B: 28 July 2012; C–D: 31 March 2012).





**Figure 2.** Location of Fazenda Fortaleza de Sant'Anna (MG, Brazil) and the surveyed points (C). Adapted from PREA (2012).

Herbarium of Universidade Federal de Juiz de Fora, and species were identified by consulting specialized bibliography (Taylor and Zappi 2004; Zappi et al. 2007) and with the help of a specialist in Cactaceae (Daniela Cristina Zappi, Royal Botanic Gardens, Kew). We examined collections from BHCB, CESJ, R, RB and VIC herbaria, and images of collection from HUEFS, P, UEC and US herbaria.

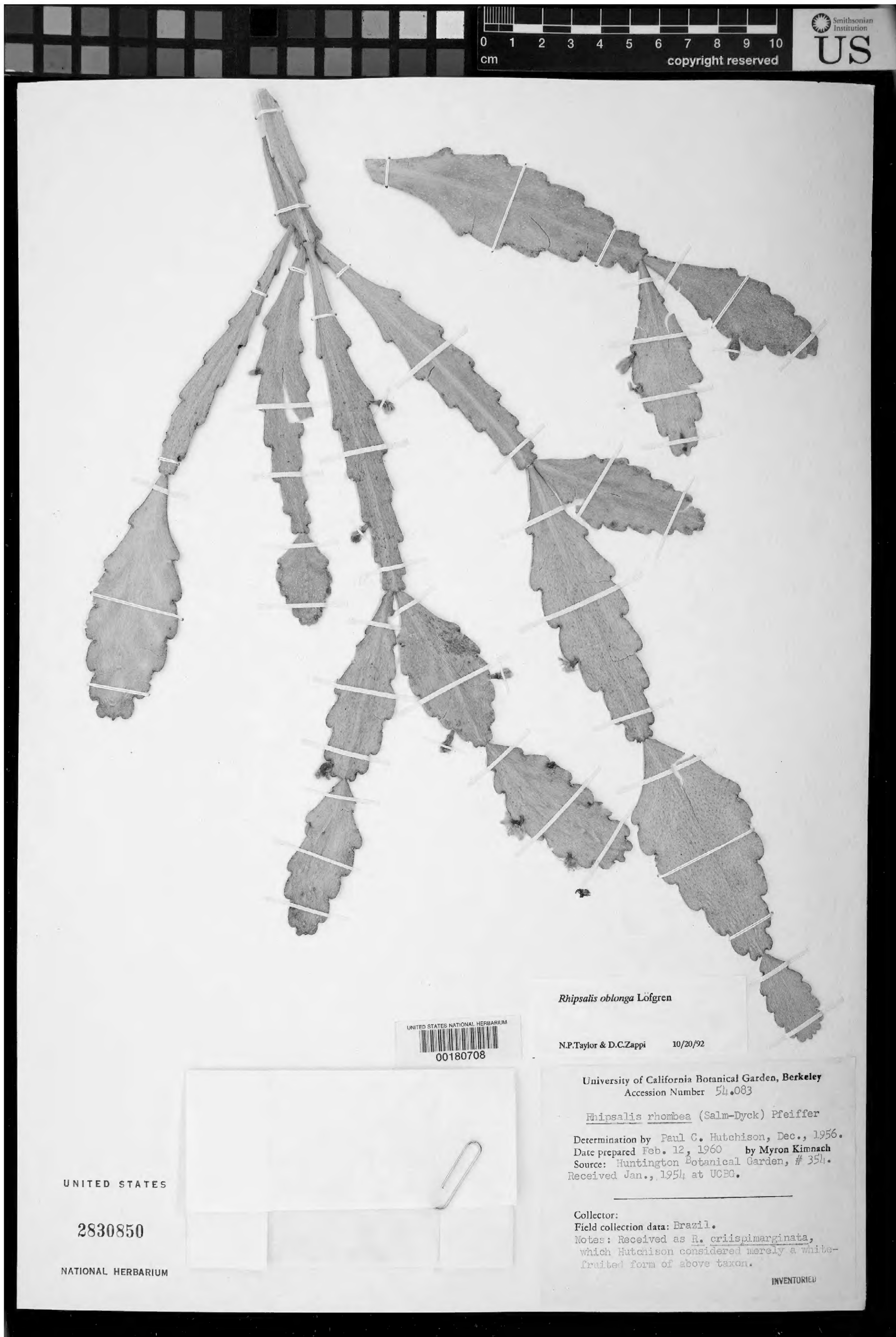
*Rhipsalis oblonga* is a pendent epiphyte, branches flattened, green, oblong,  $9.3\text{--}14.5 \times 2.9\text{--}3.6$  cm, apical or lateral ramification, crenate margin, irregular, areoles ca. 1 mm diameter, 1.3–3 cm apart; floral buds develop on the surfaces of the branches, cream or yellow; flowers cream or greenish-yellow, one or two per areole, emerged, ca.  $8 \times 5$  mm, pericarpel greenish-yellow, glabrous, perianth with 4–7 segments patent to reflexed back, stamens white, ca. 25, stigma white, 4-lobed; fruits translucent white, globose, truncate, glabrous, ca.  $6 \times 6$  cm; seeds black.

*Rhipsalis oblonga* is endemic to Brazil, occurring in Bahia, Espírito Santo, Rio de Janeiro and São Paulo states, and is commonly found in Atlantic Forest areas (Zappi et al. 2007, 2015). This species also occurs in gallery forests and mixed ombrophilous forest (Araucaria Forest) (Zappi et al. 2015).

Two collections of *R. oblonga* at US herbarium (Figures 3 and 4) are referred to Minas Gerais in speciesLink (2015). However, the occurrence of the species in this state was not recorded in the “List of Species of the Flora of Brazil” (Taylor et al. 2015) and, after our examination of images of these two collections, we concluded that these collections did not originate from Minas Gerais, and thus confirmed that *R. oblonga* is a new record for the flora of the state.

One single large individual was found in a shaded and humid environment near a stream. According to the International Union for Conservation of Nature (IUCN 2012) criteria, the species must be considered Critically Endangered in Minas Gerais, a status defined by an area of about 1 ha, and an occurrence outside a conservation unit. IUCN (2014) and Machado et al. (2013) consider the species Vulnerable (VU) in a global standpoint, as there is a tendency towards the reduction of its populations due to habitat destruction. Our result reinforces the importance of studying and conserving the forest remnants in Minas Gerais, especially the *Zona da Mata*, which has suffered from intense deforestation throughout the years.

**Material examined**—Abbreviations: fl., flower; fr., fruit; st., sterile. *Rhipsalis oblonga*—BRAZIL. 12



**Figure 3.** *Rhipsalis oblonga* at US herbarium (US 2830850), which is incorrectly referred to MG in speciesLink.



**Figure 4.** *Rhipsalis oblonga* at US herbarium (J.N. Rose & P.G. Russell s.n., US 763144), which is incorrectly referred to MG in speciesLink.



February 1960, fl., (*no collector information*) (US 2830850, photograph). BAHIA: Camacan, RPPN Serra Bonita, 23 January 2007, fl., R.A.X. Borges *et al.* 682 (HUEFS, photograph); Jussari, RPPN Serra do Teimoso, 2 April 2002, st., T.B. Breier 1180 (UEC, photograph). MINAS GERAIS: Chácara, Fazenda Fortaleza de Sant'Anna, 31 March 2012, fr., D.E.F. Barbosa *et al.* 111 (CESJ); idem, 28 July 2012, fl., D.E.F. Barbosa *et al.* 138 (CESJ). RIO DE JANEIRO: 1 January 1831, st., Gaudichaud 914 (P, photograph); Guapimirim, Granja Monte Olivete, 17 November 1993, fl., fr., J.M.A. Braga *et al.* 881 (RB); Petrópolis, Serra da Estrela, 30 March 1977, fr., G. Martinelli 1275 (RB); Rio de Janeiro, Jardim Botânico, 1915, st., J.N. Rose & P.G. Russell s.n. (US 763144, photograph); Saquarema, APA-Massambaba, Reserva Ecológica de Jacarepiá, 28 August 1991, fl., M.F. Freitas *et al.* 229 (RB); Serra dos Órgãos, 4 August 1966, st., D.R. Hunt 6512 (RB); Silva Jardim, Reserva Biológica de Poços das Antas, 30 November 1986, fr., M. Peron *et al.* 986 (RB); Teresópolis, Parque Nacional da Serra dos Órgãos, 21 October 1977, fl., P.J.M. Maas & G. Martinelli 3397 (UEC, photograph); Teresópolis, Parque Nacional da Serra dos Órgãos, 21 January 1994, fr., J.M.A. Braga & M.G. Bovini 1002 (RB); Teresópolis, s.d., fl., T.T. Carrijo *et al.* 280 (RB). SÃO PAULO: Ubatuba, 9 November 1993, fl., F. Barros *et al.* 29471 (UEC, photograph).

## ACKNOWLEDGEMENTS

We thank the Centro de Ensino Superior de Juiz de Fora, the CESJ Herbarium of Universidade Federal de Juiz de Fora, Dr. Daniela Cristina Zappi for help in confirming the identity of the species, Mr. Octaviano Falci, who granted us the license to study the area in Fazenda Fortaleza de Sant'Anna, and US herbarium for sending images of collections of *Rhipsalis oblonga*.

## LITERATURE CITED

- Barbosa, D.E.F., G.A. Basílio, F.R. Silva and L. Menini Neto. 2015. Vascular epiphytes in a remnant of seasonal semideciduous forest in the Zona da Mata, state of Minas Gerais, Brazil. *Bioscience Journal* 31: 623–633. <http://www.seer.ufu.br/index.php/biosciencejournal/article/viewFile/23571/16151>
- Calvente, A. 2012. A new subgeneric classification of *Rhipsalis* (Cactoideae, Cactaceae). *Systematic Botany* 37(4): 983–988. doi: 10.1600/036364412x656455
- Calvente, A., D.C. Zappi, F. Forest and L.G. Lohmann. 2011. Molecular phylogeny of tribe Rhipsalideae (Cactaceae) and taxonomic implications for *Schlumbergera* and *Hattiora*. *Molecular Phylogenetics and Evolution* 58: 456–468. doi: 10.1016/j.ympev.2011.01.001
- CETEC (Fundação Centro Tecnológico de Minas Gerais). 1983. Diagnóstico ambiental de Minas Gerais. Vol. 1. Belo Horizonte: CETEC. 242 pp.
- Drummond, G.M., C.S. Martins, A.B.M. Machado, F.A. Sebaio and Y.

- Antonini (eds.). 2005. Biodiversidade em Minas Gerais: um atlas para sua conservação. Belo Horizonte: Fundação Biodiversitas. 222 pp.
- Hunt, D., N. Taylor and G. Charles. 2006. The new cactus lexicon: descriptions and illustrations of the cactus family. Milborne Port, Dorset: David Hunt Books. 374 pp. (vol. 1) and 526 pp. (vol. 2).
- IUCN (International Union for the Conservation of Nature). 2012. IUCN Red List categories and criteria. Version 3.1. 2<sup>nd</sup> ed. Cambridge: IUCN Species Survival Commission. 33 pp. Accessed at <http://www.iucnredlist.org/technical-documents/categories-and-criteria>, 28 April 2015.
- IUCN (International Union for the Conservation of Nature). 2014. IUCN Red List of threatened species. Version 2014.1. Accessed at <http://www.iucnredlist.org>, 28 April 2015.
- Lino, C.F. and J.L. Albuquerque (orgs.). 2007. Cadernos da Reserva da Biosfera da Mata Atlântica, n. 32 – Mosaicos de unidade de conservação no corredor da Serra do Mar. São Paulo: Conselho Nacional da Reserva da Biosfera da Mata Atlântica. 97 pp. [http://www.rbma.org.br/rbma/pdf/caderno\\_32.pdf](http://www.rbma.org.br/rbma/pdf/caderno_32.pdf)
- Löfgren, J.A.C. 1918. Novas contribuições para o gênero *Rhipsalis*. *Archivos do Jardim Botânico do Rio de Janeiro* 2: 34–45.
- Machado, M., M.O.T. Menezes, M.R. Santos, P.V. Prieto, R.L.O. Hering, F.S.M. Barros, R.A.X. Borges, D.C. Kutschenko and A.S.M. Valente. 2013. Cactaceae; pp. 402–431, in: G. Martinelli and M.A. Moraes (orgs.). Livro vermelho da flora do Brasil. Rio de Janeiro: Jardim Botânico do Rio de Janeiro.
- Myers, N., R.A. Mittermeier, C.G. Mittermeier, G.A.B. Fonseca and J. Kent. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403: 853–858. doi: 10.1038/35002501
- PREA (Programa de Educação Ambiental). 2012. Fazenda Fortaleza de Sant'Anna: trilhando um caminho para a conservação (Relatório Técnico). Juiz de Fora: Programa de Educação Ambiental. 54 pp. Accessed at [https://caminhosparaconservacao.files.wordpress.com/2011/12/funbio\\_fazendafortalezadesatanna.pdf](https://caminhosparaconservacao.files.wordpress.com/2011/12/funbio_fazendafortalezadesatanna.pdf), 28 April 2015.
- speciesLink. [2015]. Centro de referência em informação ambiental (CRIA). Accessed at <http://splink.cria.org.br>, 28 April 2015.
- Stearn, W.T. 1939. Plantae succulentae, in Horto Alenconio: A facsimile, with an introduction by William T. Stearn. The Cactus Journal (Croydon) 7(4): 105–109. Accessed at [http://www.cactuspro.com/biblio\\_fichiers/pdf/CSJGB/CSJGB-v7\\_O.pdf](http://www.cactuspro.com/biblio_fichiers/pdf/CSJGB/CSJGB-v7_O.pdf), 5 June 2015.
- Taylor, N.P. and D.C. Zappi. 2004. Cacti of eastern Brazil. Richmond: Royal Botanic Gardens, Kew. 499 pp.
- Zappi, D., N. Taylor, M.R. Santos and J. Larocca. Cactaceae; in: Lista de espécies da flora do Brasil. Jardim Botânico do Rio de Janeiro. Accessed at <http://floradobrasil.jbrj.gov.br/jabot/floradobrasil/FB70>, 28 April 2015.
- Zappi, D.C., L.Y.S. Aona and N. Taylor. 2007. Cactaceae. *Flora Fanerogâmica do Estado de São Paulo* 5: 163–193.

**Authors' contribution statement:** DRG and LMN revised the herbarium materials. DRG and DEFB wrote the text of manuscript. LMN prepared the figures and the map, and corrected the text of manuscript. GAB and FRS participated in the field trips and added to the manuscript.

**Received:** 24 September 2014

**Accepted:** 6 June 2015

**Academic editor:** Gustavo Hassemer